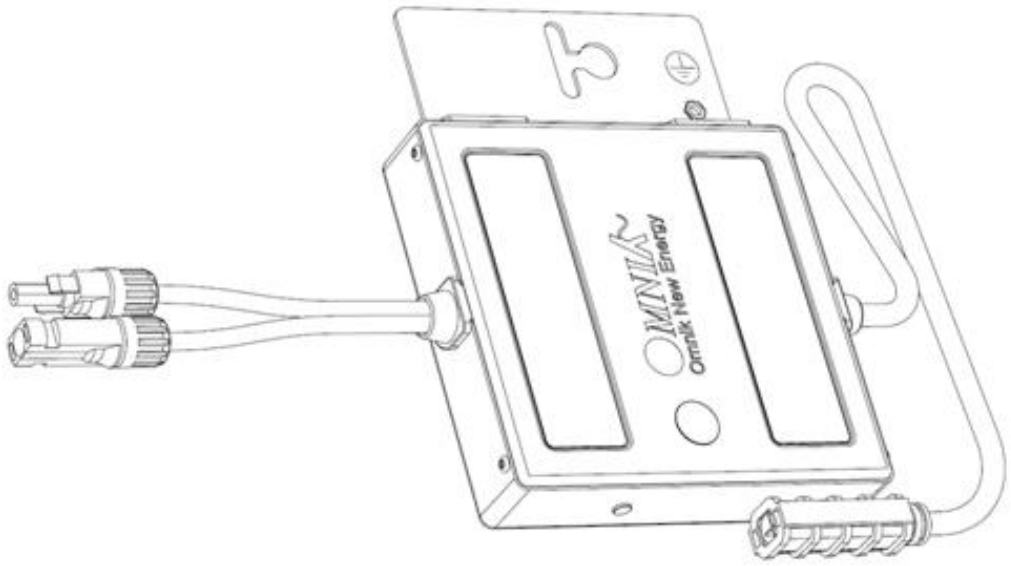

User Manual

-Installation
-Operation

Omniksol-M248

Omnik New Energy Co.,Ltd.

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1. Important Safety Information

1.1 Read it First

This manual contains important instructions for use during installation and maintenance of the Omnik M248 Micro-Inverter.
To reduce the risk of electrical shock, and to ensure the safe installation and operation of the Micro-Inverter, the following safety symbols appear throughout this document to indicate dangerous conditions and important safety instructions.

DANGER

DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.

WARNING

WARNING indicates a hazardous situation which, if not avoided, can result in death or serious injury or moderate injury.

NOTICE

NOTICE indicates a situation that can result in property damage, if not avoided.

1.2 Safety Instructions

- Do not use Omnik equipment in a manner not specified by the manufacturer. Doing so may cause death or injury to persons, or damage to equipment.
- Be aware that only qualified personnel should install or replace the Omnik Micro-Inverters and the Cable and accessories.
- Do not attempt to repair the Omnik Micro-Inverter; it contains no user-serviceable parts. If it fails, contact Omnik customer service to start

the replacement process. Tampering with or opening the Omnik Micro-Inverter will void the warranty.

- If the AC cable on the Micro-Inverter is damaged or broken, do not install the unit.
- Before installing or using the Omnik Micro-Inverter, read all instructions and cautionary markings in the technical description and on the Omnik Micro-Inverter System and the PV equipment.
- Connect the Omnik Micro-Inverter to the utility grid only after you have completed all installation procedures and after receiving prior approval from the electrical utility company.
- Be aware that the body of the Omnik Micro-Inverter is the heat sink. Under normal operating conditions, the temperature is 20°C above ambient, but under extreme conditions the Micro-Inverter can reach a temperature of 80°C (176°F). To reduce risk of burns, use caution when working with Micro-Inverters.
- Do not disconnect the PV module from the Omnik Micro-Inverter without first removing AC power.
- Be aware that the M248 has field-adjustable voltage and frequency trip points that you may need to set, depending upon local requirements. Only an authorized installer with the permission and following requirements of the local electrical utility should make adjustments.

2. Omnik Micro-Inverter System

The Omnik Micro-Inverter System is the world's most technologically advanced inverter system for use in utility-interactive applications. This manual details the safe installation and operation of the Omnik Micro-Inverter.
The two key elements of an Omnik Micro-Inverter System include the:

- Omnik M248 Micro-Inverter
- Omnik Micro-Kit

This integrated system maximizes energy harvest, increases system reliability, and simplifies design, installation and management.

2.1 How it work

The Omnik Micro-Inverter maximizes energy production from your photovoltaic (PV) array. Each Omnik Micro-Inverter is individually connected to one PV module in your array. This unique configuration means that an individual Maximum Peak Power Point Tracker (MPPT) controls each PV module. This ensures that the maximum power available from each PV module is exported to the utility grid regardless of the performance of the other PV modules in the array. That is, although individual PV modules in the array may be affected by shading, soiling, orientation, or PV module mismatch, the Omnik Micro-Inverter ensures top performance for its associated PV module. The result is maximum energy production from your PV system.

2.2 Monitoring Micro-Kit

Once you install Micro-Kit and provide an ethernet connection to your broadband router or modem, the Omnik Micro-Inverters automatically begin reporting to the Omnik Micro-Kit web server. The Micro-Kit software presents current and historical system performance trends, and it informs you of PV system status.

2.3 Optimal Reliability

Micro-Inverter systems are inherently more reliable than traditional inverters. The distributed nature of a Micro-Inverter system ensures that there is no single point of system failure in the PV system. Omnik Micro-Inverters are designed to operate at full power at ambient

temperatures as high as 65℃(150℉). The Micro-Inverter housing is designed for outdoor installation and complies with the NEMA 6 environmental enclosure rating standard:

IP65 rating definition: Indoor or outdoor use primarily to provide a degree of protection against hose-directed water, the entry of water during occasional temporary submersion at a limited depth, and damage from external ice formation.

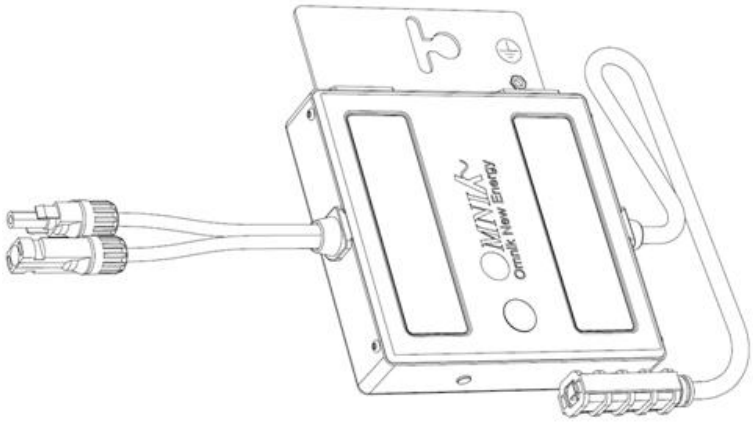
NOTE: To ensure optimal reliability and to meet warranty requirements, the Omnik Micro-Inverter must be installed according to the instructions in this manual.

2.4 Easy of Design

PV systems using Omnik Micro-Inverters are very simple to design and install. You will not need string calculations, and you can install individual PV modules in any combination of PV module quantity, type, age and orientation. You won’t need to install cumbersome traditional inverters. Each Micro-Inverter quickly mounts on the PV racking, directly beneath each PV module. Low voltage DC wires connect from the PV module directly to the co-located Micro-Inverter, eliminating the risk of personnel exposure to dangerously high DC voltage.

3. Product Information

3.1 Overview



3.2 Major Characteristics

Omnik Micro-Inverter has following characteristics which make Omnik Micro-Inverter “High Efficiency, High Reliability, High Cost Effective Ratio”

Wide DC input voltage and current range.
Wide MPP voltage range ensure high yield under various weather conditions.
High MPP tracking accuracy, ensure the minimum power loses during converting.
Complete set of protection methods.

Also, following protection methods are integrated in Omnik Micro-inverter:

- Internal overvoltage
- Ground fault protection
- Grid monitoring
- Ground fault current monitoring
- DC current monitoring

3.3 Datasheet

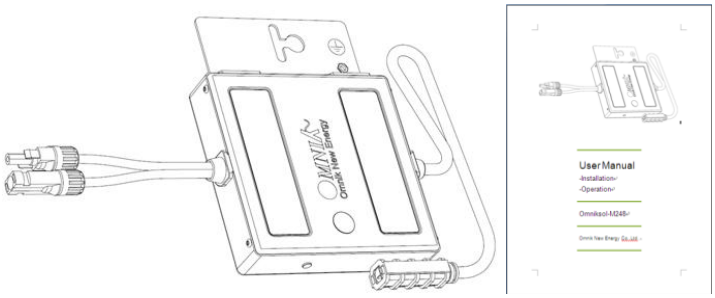
Model	**Omniksol-M248**
Input Data (DC)	
Recommended input power	160-300W
Maximum input DC voltage	50V
Min./Max. Start voltage	28V /50V
Peak power tracking range	28V～40V
Operating range	22V～40V
Maximum DC short circuit	15A
Maximum input current	9.5A
DC Feedback current	0A
Output Data (AC)	
Maximum output power	248W
Nominal output current	1.07A
Maximum output current	1.11A
Maximum output fault current	1.25Arms over 3 cycles, 26.8A peak, 2.36ms
Over Current Protection Value	6.65
Nominal output voltage	Matching grid demand
Nominal output frequency	Matching grid demand
Power factor	>0.99
Total Harmonic Distortion	<3%
Maximum units per branch	15
Efficiency	
Peak inverter efficiency	94.5%
CEC weighted efficiency	93.5%
Nighttime power consumption	120mW
Mechanical Data	
Enclosure environmental rating	IP65
Ambient temperature range	-40℃～+65 ℃
Operating temperature range	-40℃～+85℃
Dimensions (WxHxD)	221mm/169mm/36mm
Weight	1.7kg
Features	
Communication	PLCC (Power Line Carrier Communication)
Warranty	15 Years

Cooling	Natural
Pollution Degree	1

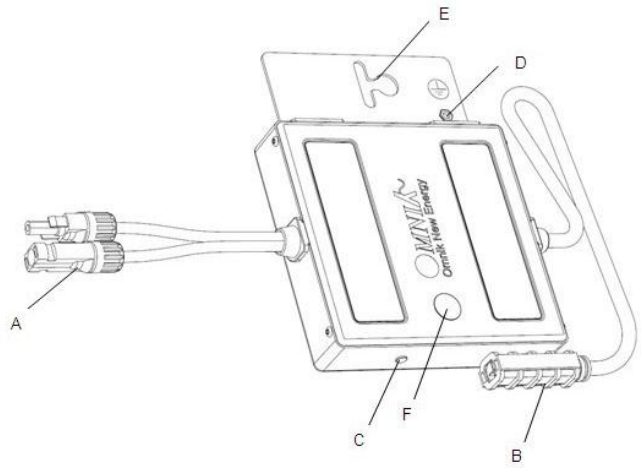
4. Packing checklist

4.1 Assembly parts

After you receive the Omnik Micro-Inverter, please check if there is any damage on the carton, and then check the inside completeness for any visible external damage on the Micro-Inverter or any accessories. Contact your dealer if anything is damaged or missing.



4.2 Product Description



Item	Description
A	DC connectors
B	AC connector
C	Led
D	Grounding hole
E	Wall bracket hole
F	Porting cover

4.3 Further information

If you have any further questions concerning the type of accessories or installation, please check our website www.omnik-solar.com or contact our service hotline.

5. Planning of Micro-Inverter Installation

5.1 Explanations of Symbols on Inverter

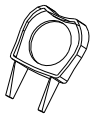
Symbol	Description
	Dangerous electrical voltage This device is directly connected to public grid, thus all work to the inverter shall only be carried out by qualified personnel.
	NOTICE, danger! This device directly connected with electricity generators and public grid.
	Danger of hot surface The components inside the inverter will release a log of heat during operation, DO NOT touch aluminum housing during operating.
	An error has occurred Please go to Chapter 10 “Trouble Shooting” to remedy the error.
	This device SHALL NOT be disposed of in residential waste Please go to Chapter 9 “Recycling and Disposal” for proper treatments.
	No unauthorized perforations or modifications Any unauthorized perforations or modifications are strictly forbidden, if any defect or damage (device/person) is occurred, Omnik shall not take any responsibility for it.

5.2 Lightning and Surge Suppression

Omnik Micro-Inverters have integral surge protection, greater than most traditional inverters. However, if the surge has sufficient energy, the protection built into the Micro-Inverter can be exceeded, and the equipment can be damaged. For this reason, Omnik recommends that you protect your system with lightning and/or surge suppression devices. In addition to having some level of surge suppression, it is important to have insurance that protects against lightning and electrical surges.

6. Micro-Inverter Mounting and Wiring

6.1 Tool Required

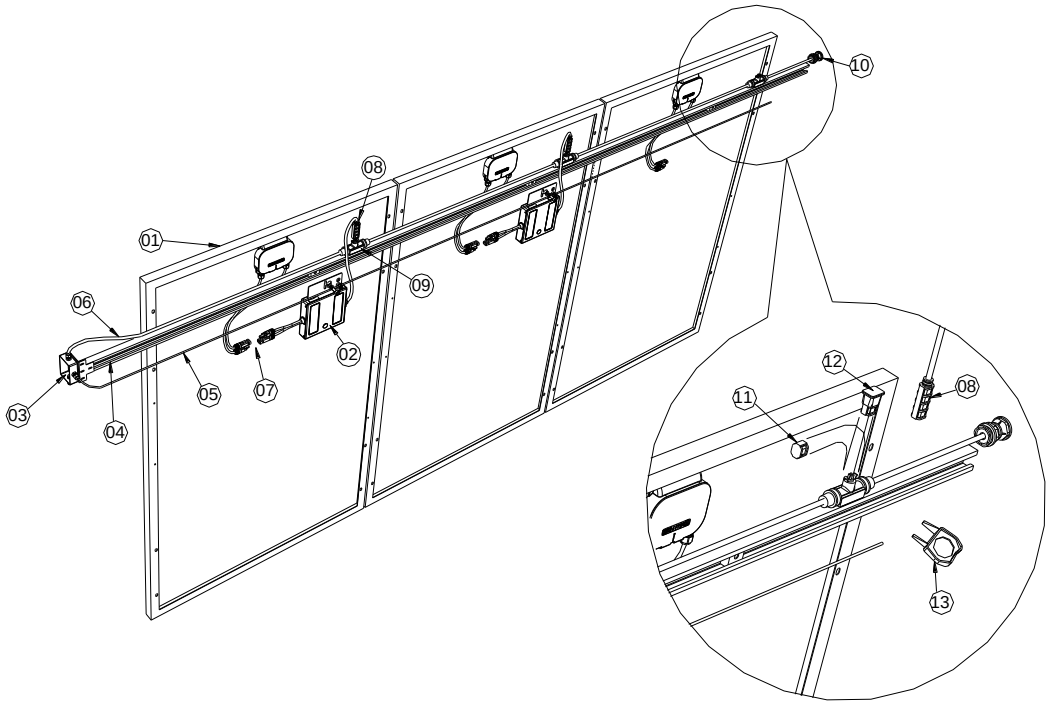


6.2 Installation Diagram

01. PV module
02 .Micro inverter
03 .Junction box
04. Mounting rail
05 .Grounding line
06 .AC power cable
07. DC connectors
08 .AC connector
09 .T-connector of AC power cable
10 .Cable end cap
11 .T connector temporary plug cap
12 .Plug sealing cap
13. Unlocking tool

DANGER

DO NOT connect or disconnect the PV module and Omnik Micro-Inverter without first removing AC power from the PV system.



6.3 Installation Steps

Installing the Micro inverter System involves several key steps. Each step listed here is detailed in the following page.

Step1: Check system configuration

Step2: Connect AC power cable and fix T-connector

Step3: Install inverter

Step4: Ground connection

Step5: Install the end cap of AC power cable

Step6: Connect inverter AC output and access AC power cable to AC bus box

Step7: Statistics installation diagram

Step8: Connect PV module

Step9: Install Micro-Kit

WARNING

Allow a minimum of 1.9cm between the roof and the bottom of the microinverter. Also allow 1.3cm between the back of the PV module and the top of the microinverter.

WARNING

You must install the microinverter under the module, out of rain and sun. Do not mount the microinverter in a position that allows long-term exposure to direct sunlight or in a vertical orientation that allows water to collect in the DC connect recess.

WARNING

The microinverter is not equipped to operate in environments that have particular flammability or explosive conditions.

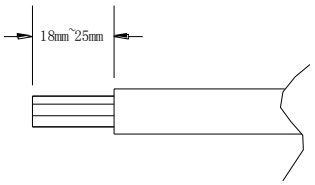
NOTICE

If this microinverter is installed in Australia, Electrical Installation & Maintenance shall be conducted by licensed electrician and shall comply with Australia National Rules.

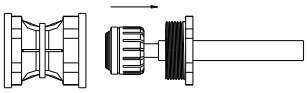
NOTICE

During installation, if the arrays are mono-crystalline or polycrystalline solar cells, the array should be floating. If the arrays are thin-film cells, the PV negative pole should be grounded.

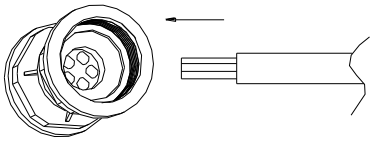
6.4 Cable end installation



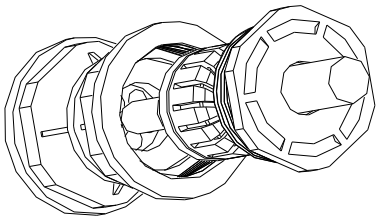
Strip cable jacket 18mm~25mm



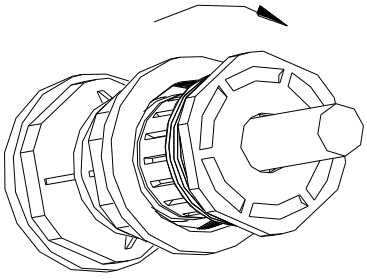
Disassemble the Seal, Clamp ring, Nut, then Insert through the cable



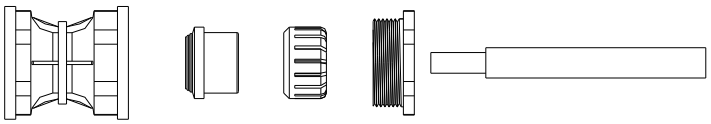
Insert each wires into the holes



Push he cable to the end. Gently try to pull out the cable. It should not be pulled out



Screw the sealing nut into body tightly with a force of 25 Kgf.cm



Note:

Wire size/ Inner jacket OD Max: 10AWG (6mm2) / Max OD 4.65mm
Recommended sealing nut torque: 25Kgf.cm (2.5N.m)
Recommended installation temperature: 20℃ (60℉) upward
Avoid oil and gasoline
Waterproof rote :IP67

7. Commissioning and Operation

Please notice the symbols.

WARNING

Qualified personnel only may connect the Omnik Micro-Inverter to the utility grid after receiving prior approval from the electrical utility company.

WARNING

Ensure that all AC and DC wiring is correct. Ensure that none of the AC and DC wires are pinched or damaged. Ensure that all AC junction boxes are properly closed.

7.1 Energize the System

1. Turn ON the AC disconnect or circuit breaker for each Micro-Inverter AC branch circuit.
2. Turn ON the main utility-grid AC circuit breaker. Your system starts producing power after a five-minute wait time.
3. The Omnik Micro-Inverters begins communicating over the power lines to the Micro-Kit. The time required for all Micro-Inverters to report to the Micro-Kit with the number of Micro-Inverters in the system. The first units should be detected within 15 minutes but the entire system could take hours to detect.
4. The M248 has field-adjustable voltage and frequency trip points. If adjustments are required by your local utility, the installer can use the Micro-Kit to Manage the Grid Profile after all Micro-Inverters have been detected.

7.2 M248 Operation

The Omnik Micro-Inverter is powered on when sufficient DC voltage from the PV module is applied. The Status LED of each Micro-Inverter will blink green to indicate normal start-up operation approximately one minute after

DC power is applied. You may need to use a handheld mirror to view indicator lights on the undersides of the Micro-Inverters.

8. Troubleshooting and Maintenance

Adhere to all the safety measures described throughout this manual. Qualified personnel can use the following troubleshooting steps if the PV system does not operate correctly.

WARNING

Do not attempt to repair the Omnik Micro-Inverter; it contains no user-serviceable parts. If the Micro-Inverter fails, contact Omnik customer service to obtain an RMA (return merchandise authorization) number and start the replacement process.

8.1 Status LED Indications and Error Reporting

Startup LED Operation:

The Status LED of each Micro-Inverter blinks green to indicate normal start-up operation approximately one minute after DC power is applied. Red blinks after DC power is first applied to the Micro-Inverter indicate a failure during Micro-Inverter startup.

Post-Startup LED Indications:

Use a handheld mirror to view indicator lights on the undersides of the Micro-Inverters:

Flashing Green: Indicates normal operation.

Flashing Red: Indicates that the Micro-Inverter is **not operating normally**. The Micro-Inverter does not sense that the utility grid is within voltage/frequency specifications. The Micro-Inverter cannot produce power until this is resolved.

8.2 Troubleshoot an Inoperable Micro-Inverter

To troubleshoot an inoperable Micro-Inverter, follow the steps in the order shown.

WARNING: Be aware that only qualified personnel should troubleshoot the PV array or the Omnik Micro-Inverter.

Best Practice: Never disconnect the DC wire connectors under load. Ensure that no current is flowing in the DC wires prior to disconnecting. If necessary, use an opaque covering to cover the PV module prior to disconnecting the PV module. Always disconnect AC power before disconnecting the PV module wires from the Omnik Micro-Inverter. The AC connector of the Micro-Inverter is suitable as a disconnecting means.

WARNING: The AC and DC connectors on the cabling are rated as a disconnect only when used with an Omnik Micro-Inverter.

WARNING: The Omnik Micro-Inverters are powered by DC power from the PV modules. Make sure you disconnect the DC connections and reconnect DC power to watch for the LED blinks one minute after DC is applied.

1. Make sure AC breakers and disconnects are closed.
2. Check the connection to the utility grid and verify that the utility voltage is within allowable ranges shown in the Technical Data section on page 9 of this manual.
3. Verify that AC line voltage at all solar power circuit breakers at the load center and subpanels is within the ranges shown in the following table.
4. Verify that AC line voltage at the junction box for each AC branch circuit are within the ranges are shown in the following table:

230 or 240 Volt AC, Single Phase		**208 Volt AC, Three Phase**	
L to N	184 to 264 VAC	(L1 to L2) or (L2 to L3) or(L3 to L1)	183 VAC

5. Using an Omnik disconnect tool, disconnect the AC cable for the Micro-Inverter in question from the Cable.
6. Verify that utility power is present at the Micro-Inverter by measuring line to line and line to neutral at the Cable connector.
7. Visually check that the AC branch circuit connections (Cable and AC connections) are properly seated. Reseat if necessary. Check also

for damage, such as rodent damage.

8. Make sure that any upstream AC disconnects, as well as the dedicated circuit breakers for each AC branch circuit, are functioning properly and are closed.

9. Disconnect and re-connect the DC PV module connectors. The Status LED of each Micro-Inverter will blink green to indicate normal start-up operation soon (less than one minute) after DC power is applied. The LED subsequently resumes normal operation if the Grid is present..

10. Attach an ammeter clamp to one conductor of the DC cables from the PV module to measure Micro-Inverter current. This will be under one Amp if AC is disconnected.

11. Check the DC connections between the Micro-Inverter and the PV module. The connection may need to be tightened or reseated. If the connection is worn or damaged, it may need replacement.

12. Verify with your utility that line frequency is within range.

8.3 Micro-Inverter Maintenance

Routine Maintenance, although not mandatory, is recommended to maintain efficient operation of the PV installation.

WARNING

It is recommended that maintenance operations be only performed by qualified personnel or Omnik personnel.
The maintenance schedule may vary depending on the environmental conditions of the installation site.

Routine Maintenance

Annual Cleaning	Conduct an annual visual inspection(where possible) on the various components(DC cables, Micro-Inverters and AC cables) to check for dust, dirt, moisture and water seepage. Clean the equipment if necessary. Clean using compressed air, a vacuum cleaner or special brushes, if possible.
Annual Operations	Check that there has been no drastic change in the installation conditions that might have a negative influence on radio communication with the micro-inverters.

9. Contact

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